

**WHAT IS CLAIMED IS:**

1. A system for transmitting signals through an imperfectly-conducting medium comprising:

a transmitter station, the transmitter station comprising:

a transmitter, and one or more transmitter conductors coupled to the transmitter, wherein the transmitter causes a signal to be transmitted to be coupled to the transmitter conductors to cause a current to flow in the imperfectly-conducting medium, thereby creating an electric field corresponding to the signal to be transmitted;

a receiver station, the receiver station comprising:

a receiver, and

one or more receiver conductors coupled to the receiver through one or more leads, wherein the receiver conductors receive the signal to be transmitted by sensing the electric field; and  
output means for outputting the received signal.

2. The system recited in claim 1, wherein the transmitter station and the receiver station are contained in a single-unit transceiver.

3. The system recited in claim 1, wherein one of the receiver station and the transmitter station has a single conductor.

4. The system recited in claim 1, wherein either or both the transmitter station or the receiver station is not submerged in the imperfectly-conducting medium.

5. The system recited in claim 1, wherein either or both the transmitter station and receiver station are not immersed in the imperfectly-conducting medium, and wherein the system is used to determine a property of the imperfectly-conducting medium.

6. The system recited in claim 2, wherein the transceiver is submerged in the imperfectly-conducting medium and changes in the electric field are analyzed to determine the presence of an object in the imperfectly-conducting medium.

7. The system recited in claim 1, wherein the receiver station further comprises;  
more than two conductors, and  
a combiner for selecting signals from two of the conductors, for input to the receiver.

8. The system recited in claim 7, wherein the system finds the greatest signal strength of the available conductor pairs.

9. The system recited in claim 1, wherein the receiver station further comprises;  
more than two conductors, and  
a combiner which connects the conductors into two connected groups, for input to the receiver.

10. The system recited in claim 9, wherein the system finds the greatest signal strength of the available connected groups of conductors.

11. The system recited in claim 1, where the transmitter and receiver conductors are self-contained.

12. A method for transmitting a signal through an imperfectly-conducting medium comprising the steps of:

generating a signal to be transmitted across the imperfectly-conducting medium;  
generating an electric field corresponding to the signal;  
sensing the electric field to detect the signal; and  
outputting the signal.

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13. The method recited in claim 12, further comprising the step of determining a direction of the transmitter.

14. The method recited in claim 12, further comprising the step of causing a current to flow between a transmitter conductor and a receiver conductor.

15. The method recited in claim 12, further comprising the step of determining a property of the imperfectly-conducting medium.

16. The method recited in claim 12, further comprising the step of activating a medical device.

17. The method recited in claim 12, further comprising the step of orienting conductors to generate and sense the electric field collinear to one another.

18. A system for transmitting a signal through an imperfectly-conducting medium using an electric field, comprising:

a transmitter to transmit the signal;

means for generating a current in the imperfectly-conducting medium to thereby generate an electric field corresponding to the signal;

a receiver to receive the signal;

and an output device to output the signal.

19. The system recited in claim 18, further comprising means for activating a medical device.

20. The system recited in claim 18, further comprising means for determining a direction of the transmitted signal.

21. The system recited in claim 18, further comprising means for determining an object in the imperfectly-conducting media.